

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-026753

(43)Date of publication of application : 28.01.1997

(51)Int.Cl.

G09F 9/00  
G02F 1/1345

(21)Application number : 07-177617

(71)Applicant : SANYO ELECTRIC CO LTD

(22)Date of filing : 13.07.1995

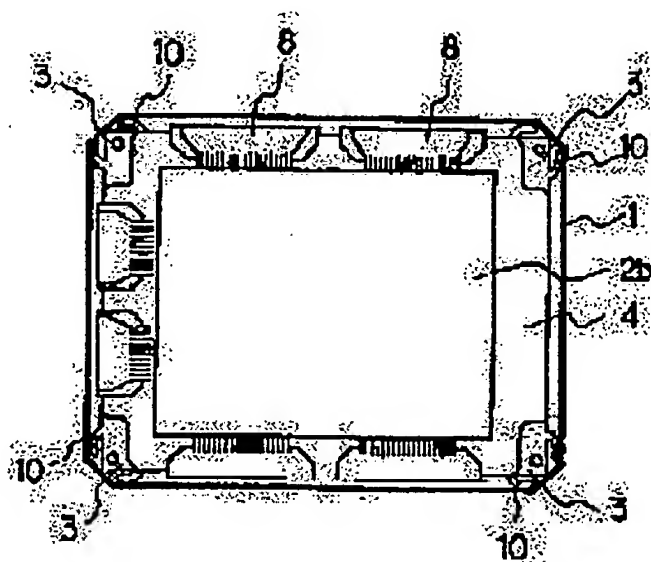
(72)Inventor : FUJII TETSUO

## (54) DISPLAY MODULE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain an equipment which is strong against impact and vibration by controlling the play of an LCD panel the inside a shielding case by an LCD module where the LCD panel is housed inside the shielding case.

**SOLUTION:** A protrusion 10 that is made of the same material as a spacer 3 and whose one end is formed integrally with the main body of the spacer 3 is provided at the outer periphery of the spacer 3 supporting the LCD panel 2, so that the LCD panel 2 is elastically supported, fixed and stabilized inside the shielding case 1 by the spring of the protrusion 10.



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**CLAIMS**

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[Claim(s)]

[Claim 1]Within a panel for a display, a shielding case which stores this panel, and said shielding case, When the 1st projection that has elasticity is provided in a periphery of said spacer in a display module which consists of a spacer which supports said panel and said 1st projection contacts a wall of said shielding case, A display module, wherein said spacer has a predetermined interval in said shielding case and is elastically fixed to it.

[Claim 2]Within a panel for a display, a shielding case which stores this panel, and said shielding case, A display module, wherein the 2nd projection that has elasticity is provided in a seating rim of said spacer in a display module which consists of a spacer which supports said panel, it supports a gap of said panel and said spacer and said panel is elastically fixed within said spacer.

[Claim 3]The display module according to claim 1 or 2 said projection's consisting of said spacer and an identical material, and forming an end in said spacer and one.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the display panel which used the liquid crystal etc., and the display module which stored LSI for a drive of the display panel.

[0002]

[Description of the Prior Art]As a display device, the liquid crystal display (LCD:Liquid Crystal Display) which used the liquid crystal for the optical member has advantages, such as small size, a thin shape, and low power consumption, and utilization is following it in the field of OA equipment, AV equipment, etc. the matrix type which impresses voltage while carrying out crisscross arrangement of the transparent electrode for a liquid crystal drive and choosing a display point in matrix especially -- further, The active-matrix type which makes the signal level always hold electrostatically, carrying out connection formation of the switch element at each pixel capacity for a liquid crystal drive, rewriting to line sequential, and choosing a pixel, Animation display of a high definition and a high contrast ratio is attained, and it is put in practical use by the display of a personal computer, television, etc.

[0003]The lineblock diagram of an LCD module is shown in drawing 3. (1) is a rear shielding case in which an LCD panel and (3) become the front shielding case which consists of sheet metal, and (2), and a printed-circuit board and (5) consist of sheet metal the spacer made of resin, and (4). In a shielding case (1, 5), an LCD panel (2) and a printed-circuit board (4) are supported by a spacer (3), and are stored. An LCD panel (2) seals a liquid crystal between the transparent electrode substrates (2a, 2b) of couples, such as glass. TCP (tapecarrier package) (8) which carried out bonding loading of the LSI for a drive (7) is attached on flexible tapes (6), such as polyimide which carried out wiring formation to the electrode substrate (2a) of the larger one by copper foil. Interface circuitry is carried in the printed-circuit board (4), and an external input signal is supplied to LSI for a drive (7) via a printed-circuit board (4). Thus, the

transmissivity distribution corresponding to a picture in the LCD panel (2) in which image information signal voltage was supplied is given, and visibility is given by the parallel beam from the back light section of another unit which was not illustrated.

[0004]A flexible tape (7) one end by anisotropic conductive adhesive (anisotropic conductive film), i.e., ACF. The terminal area exposed to the LCD panel (2) is pasted, soldering connection of other ends is carried out to a printed-circuit board (4), and these LCD panels (2) and a printed-circuit board (4) are supported by the spacer (3).

[0005]

[Problem(s) to be Solved by the Invention]Although an LCD panel (2) and a printed-circuit board (4) are pasted up on a spacer (3) and it is fixed within a shielding case (1, 5), By usually, the common difference of the inside dimension of a shielding case (1, 5), and the outer size of a spacer (3). The spacer (3) shook within the shielding case (1, 5), especially, for uses, such as an object for mount, and portable, vibration and a shock were added to an LCD panel (2), LSI for a drive (7), etc., and there were a safe top of a device and a problem.

[0006]It is not avoided on processing that the size of each part article has some dispersion, Even when the inside dimension of a shielding case (1, 5) is fewer than the outer size of a spacer (3), especially When small, When storing a spacer (3) in a shielding case (1, 5), problems, like that efficiency not only falls, but work becomes difficult, modular completion becomes impossible and parts become useless and the yield falls were caused.

[0007]

[Means for Solving the Problem]In a display module which consists of a spacer which accomplished in order that this invention might solve this technical problem, and supports [ 1st ] said panel within a panel for a display, a shielding case which stores this panel, and said shielding case, The 1st projection that has elasticity is provided in a periphery of said spacer, a wall of said shielding case and a gap of said spacer are supported, and said spacer is composition elastically fixed within said shielding case.

[0008]In a display module which consists of a spacer which supports [ 2nd ] said panel within a panel for a display, a shielding case which stores this panel, and said shielding case, The 2nd projection that has elasticity is provided in a seating rim of said spacer, and a gap of said panel and said spacer is supported, It is the composition which said panel is elastically fixed within said spacer, and said especially projection is set to the 3rd from said spacer and an identical material in the 1st or 2nd composition, and is formed in said spacer and one in an end.

[0009]

[Function]Since the display panel supported by the spacer by providing a projection with elasticity in the spacer which supports a display panel, and fixing to it elastically within a shielding case with the 1st and 2nd composition of this invention also has elasticity and is fixed, display equipment strong against vibration or a shock is obtained.

[0010]By being the frame and identical material of a spacer about the projection which fixes a spacer to a shielding case elastically, and forming an end in a spacer body and one with the 3rd composition of this invention, it is obtained without a projection with elasticity adding a process, and there is no increase of cost.

[0011]

[Example]Then, the example of this invention is described in detail. Drawing 1 is a plan of the LCD module concerning the 1st example of this invention. The front shielding case into which (1) processed sheet metal, and (2) seal a liquid crystal among one pair of transparent electrode substrates in which the transparent electrode was formed on the transparent substrate, the LCD panel controlled by impressing different voltage for every pixel by the transmissivity distribution corresponding to display image information, the spacer with which (3) consists of resin materials, and the printed-circuit board in which (4) formed the predetermined circuit pattern on the glass epoxy resin -- it comes out. Although the graphic display was excluded, it is usually equipped with the rear shielding case (5) which consists of sheet metal from a space near side, and a module is completed. To the electrode substrate (2a) side with the larger space other side which the electrode substrate (2b) of the smaller one was turned to space this side, and was not illustrated, an LCD panel (2). TCP (tape carrier package) (8) which carries out bonding loading of the LSI for a drive on flexible tapes, such as polyimide which performed wiring formation by copper foil, It pastes up by anisotropic conductive adhesive (anisotropic conductive film), i.e., ACF, and is electrically connected to LCD electrode wiring. The other end of TCP (8) is turned to space this side at a side, and is connected to the printed-circuit board (4) by solder. Interface circuitry was carried in the printed-circuit board (4), the input signal was changed into the LCD drive, and it has distributed to each LSI for a drive. It is supported by a spacer (3), an outer frame is formed with a shielding case (1, 5), and these LCD panels (2) and a printed-circuit board (4) are assembled by the LCD module.

[0012]The projection (10) which it was the same resin material as a spacer (3), and the end was formed in the main part of a spacer (3) and one, and was given elasticity is provided in the outermost periphery of the spacer (3). The projection (10) of the vertical and horizontal dimension of the spacer (3) which was formed in the rectangular head of the spacer (3) and contained this projection (10) is larger than the inside dimension of a shielding case (1, 5), and its vertical and horizontal dimension of the main part of a spacer (3) except a projection (10) is smaller than the inside dimension of a shielding case (1, 5). for this reason, a spacer (3) -- the inside of a shielding case (1, 5) -- storage -- while it is easy, a spacer (3) is elastically fixed within a shielding case (1, 5) by the reaction by which a projection (10) is held down elastically [ wall / of a shielding case (1, 5) ].

[0013]It is a product made of resin of a spacer (3) and one, such a projection (10) is

simultaneously formed at the time of processing of a spacer (3), and since the addition of a process is unnecessary, an increase in cost does not have it. Drawing 2 is a back view of the LCD module concerning the 2nd example of this invention. The same numerals are attached to the same subject as the 1st example. There is an LCD panel (2) in space this side, and, back [ the ], a spacer (3) and the printed-circuit board (4) which was not further illustrated in the other side are. An LCD panel (2) turns the electrode substrate (2a) of the larger one to the front, and the electrode substrate (2b) of the smaller one is on the other side of space, as a broken chain line shows. In this example, an LCD panel (2) is not, if a spacer (3) is pasted, but in the rectangular head of an LCD panel (2), it is supported with the projection (11) provided in the spacer (3) side. Namely, in drawing 2, a spacer (3) is behind an LCD panel (2), The opening shown according to the two-dot chain line is located in the indicator of an LCD panel (2), and is imminent from the flat surface of spacer (3) main part in the portion corresponding to the rectangular head of an LCD panel (2), there is a \*\*\*\*\* supporter (3a), and the lobe (11) which touches an LCD panel (2) directly is provided in this supporter (3a). Like the projection (10) explained in the 1st example, this projection (11) consists of the same resin material as a spacer (3), and an end is formed in the main part of a spacer (3), and one, and it has elasticity. Although the seating-rim part formed in the spacer (3) is equipped with an LCD panel (2), an LCD panel (2) is elastically supported with the projection (11) provided in the seating rim of the spacer (3) in the rectangular head in that case. The size constituted between projections (11) is smaller than the outer size of an LCD panel (2), and the size of the spacer (3) seating rim except a projection (11) is formed more greatly than an LCD panel (2). For this reason, by equipping a spacer (3) with an LCD panel (2), setting like an assembler and holding down a projection (11), it is elastically fixed to a spacer (3) by the reaction from a projection (11), and an LCD panel (2) is stabilized. Since spreading of adhesives for pasting up an LCD panel (2) on a spacer (3) becomes unnecessary, a man day is reduced and it is advantageous also in cost. As the 1st example explained, form a projection (10) also in a spacer (3) periphery, and as shown also in drawing 2 by operation of these projections (10, 11). Between an LCD panel (2) and a spacer (3) and between a shielding case (1) and a spacer (3), the composition which gives elasticity is also possible.

[0014]

[Effect of the Invention]In the display module which stores the panel for a display in a shielding case by this invention so that clearly from the above explanation, Since it is fixed elastically and a display panel is stabilized by providing a projection with elasticity in a spacer and making the gap between a display panel and a spacer or between a shielding case and a spacer support, a shock and display equipment strong against vibration are obtained.

[0015]It is a spacer and an identical material about such a projection, and by forming an end by a spacer body and one, the addition of a process is unnecessary and advantageous also in

cost.

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TECHNICAL FIELD

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**PRIOR ART**

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[Description of the Prior Art] As a display device, the liquid crystal display (LCD: Liquid Crystal Display) which used the liquid crystal for the optical member has advantages, such as small size, a thin shape, and low power consumption, and utilization is following it in the field of OA equipment, AV equipment, etc. the matrix type which impresses voltage while carrying out crisscross arrangement of the transparent electrode for a liquid crystal drive and choosing a display point in matrix especially – further, The active-matrix type which makes the signal level always hold electrostatically, carrying out connection formation of the switch element at each pixel capacity for a liquid crystal drive, rewriting to line sequential, and choosing a pixel, Animation display of a high definition and a high contrast ratio is attained, and it is put in practical use by the display of a personal computer, television, etc.

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[0004] A flexible tape (7) one end by anisotropic conductive adhesive (anisotropic conductive film), i.e., ACF. The terminal area exposed to the LCD panel (2) is pasted, soldering

connection of other ends is carried out to a printed-circuit board (4), and these LCD panels (2) and a printed-circuit board (4) are supported by the spacer (3).

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**EFFECT OF THE INVENTION**

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[Effect of the Invention]In the display module which stores the panel for a display in a shielding case by this invention so that clearly from the above explanation, Since it is fixed elastically and a display panel is stabilized by providing a projection with elasticity in a spacer and making the gap between a display panel and a spacer or between a shielding case and a spacer support, a shock and display equipment strong against vibration are obtained.

[0015]It is a spacer and an identical material about such a projection, and by forming an end by a spacer body and one, the addition of a process is unnecessary and advantageous also in cost.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]Although an LCD panel (2) and a printed-circuit board (4) are pasted up on a spacer (3) and it is fixed within a shielding case (1, 5), By usually, the common difference of the inside dimension of a shielding case (1, 5), and the outer size of a spacer (3). The spacer (3) shook within the shielding case (1, 5), especially, for uses, such as an object for mount, and portable, vibration and a shock were added to an LCD panel (2), LSI for a drive (7), etc., and there were a safe top of a device and a problem.

[0006]It is not avoided on processing that the size of each part article has some dispersion, Even when the inside dimension of a shielding case (1, 5) is fewer than the outer size of a spacer (3), especially When small, When storing a spacer (3) in a shielding case (1, 5), problems, like that efficiency not only falls, but work becomes difficult, modular completion becomes impossible and parts become useless and the yield falls were caused.

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**MEANS**

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[Means for Solving the Problem]In a display module which consists of a spacer which accomplished in order that this invention might solve this technical problem, and supports [ 1st ] said panel within a panel for a display, a shielding case which stores this panel, and said shielding case, The 1st projection that has elasticity is provided in a periphery of said spacer, a wall of said shielding case and a gap of said spacer are supported, and said spacer is composition elastically fixed within said shielding case.

[0008]In a display module which consists of a spacer which supports [ 2nd ] said panel within a panel for a display, a shielding case which stores this panel, and said shielding case, The 2nd projection that has elasticity is provided in a seating rim of said spacer, and a gap of said panel and said spacer is supported, It is the composition which said panel is elastically fixed within said spacer, and said especially projection is set to the 3rd from said spacer and an identical material in the 1st or 2nd composition, and is formed in said spacer and one in an end.

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**OPERATION**

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[Function]With the 1st and 2nd composition of this invention, it had elasticity in the spacer which supports a display panel. Since the display panel supported by the spacer by providing a projection and fixing elastically within a shielding case also has elasticity and is fixed, display equipment strong against vibration or a shock is obtained.

[0010]By being the frame and identical material of a spacer about the projection which fixes a spacer to a shielding case elastically, and forming an end in a spacer body and one with the 3rd composition of this invention, it is obtained without a projection with elasticity adding a process, and there is no increase of cost.

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EXAMPLE

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[Example]Then, the example of this invention is described in detail. Drawing 1 is a plan of the LCD module concerning the 1st example of this invention. The front shielding case into which (1) processed sheet metal, and (2) seal a liquid crystal among one pair of transparent electrode substrates in which the transparent electrode was formed on the transparent substrate, the LCD panel controlled by impressing different voltage for every pixel by the transmissivity distribution corresponding to display image information, the spacer with which (3) consists of resin materials, and the printed-circuit board in which (4) formed the predetermined circuit pattern on the glass epoxy resin -- it comes out. Although the graphic display was excluded, it is usually equipped with the rear shielding case (5) which consists of sheet metal from a space near side, and a module is completed. To the electrode substrate (2a) side with the larger space other side which the electrode substrate (2b) of the smaller one was turned to space this side, and was not illustrated, an LCD panel (2). TCP (tape carrier package) (8) which carries out bonding loading of the LSI for a drive on flexible tapes, such as polyimide which performed wiring formation by copper foil, It pastes up by anisotropic conductive adhesive (anisotropic conductive film), i.e., ACF, and is electrically connected to LCD electrode wiring. The other end of TCP (8) is turned to space this side at a side, and is connected to the printed-circuit board (4) by solder. Interface circuitry was carried in the printed-circuit board (4), the input signal was changed into the LCD drive, and it has distributed to each LSI for a drive. It is supported by a spacer (3), an outer frame is formed with a shielding case (1, 5), and these LCD panels (2) and a printed-circuit board (4) are assembled by the LCD module.

[0012]The projection (10) which it was the same resin material as a spacer (3), and the end was formed in the main part of a spacer (3) and one, and was given elasticity is provided in the outermost periphery of the spacer (3). The projection (10) of the vertical and horizontal dimension of the spacer (3) which was formed in the rectangular head of the spacer (3) and

contained this projection (10) is larger than the inside dimension of a shielding case (1, 5), and its vertical and horizontal dimension of the main part of a spacer (3) except a projection (10) is smaller than the inside dimension of a shielding case (1, 5). for this reason, a spacer (3) -- the inside of a shielding case (1, 5) -- storage -- while it is easy, a spacer (3) is elastically fixed within a shielding case (1, 5) by the reaction by which a projection (10) is held down elastically [ wall / of a shielding case (1, 5) ].

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a plan of the LCD module concerning the 1st example of this invention.

[Drawing 2]It is a back view of the LCD module concerning the 2nd example of this invention.

[Drawing 3]It is a lineblock diagram of an LCD module.

[Description of Notations]

- 1 Front shielding case
- 2 LCD panel
- 3 Spacer
- 4 Printed-circuit board
- 5 Rear shielding case
- 6 Flexible tape
- 7 LSI for a drive
- 8 TCP
- 10 and 11 Projection

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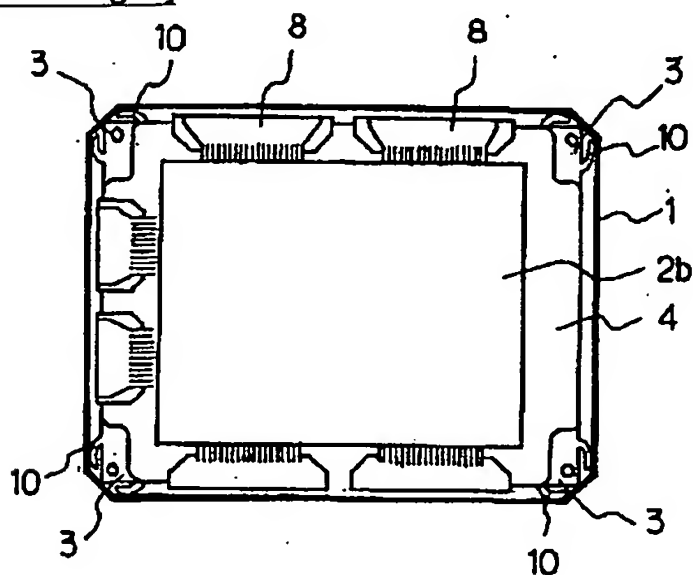
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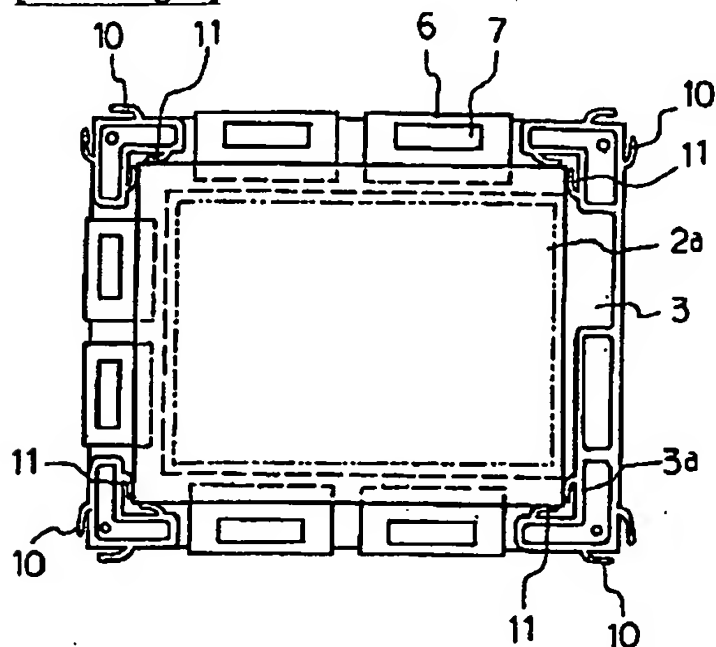
DRAWINGS

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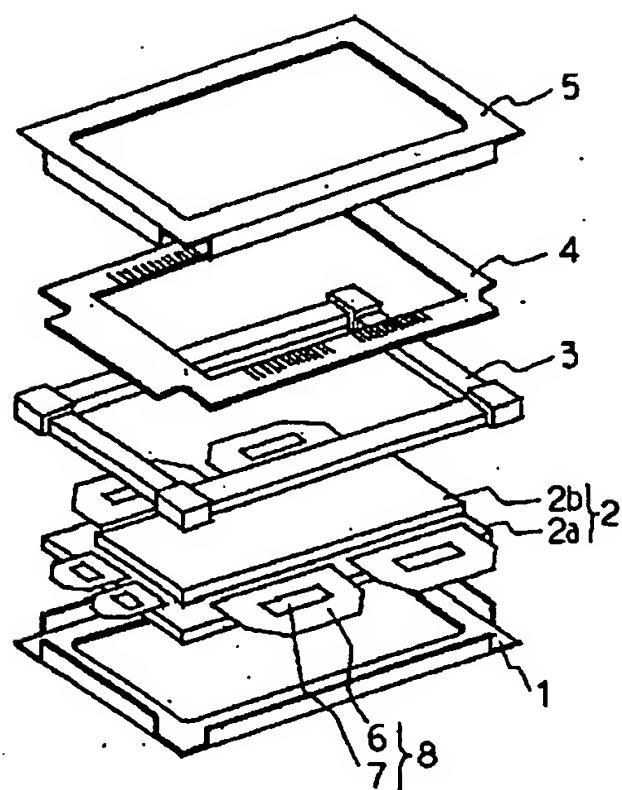
[Drawing 1]



[Drawing 2]



[Drawing 3]




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[Translation done.]

(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号

特開平9-26753

(43)公開日 平成9年(1997)1月28日

(51)Int.Cl. <sup>6</sup>	識別記号	庁内整理番号	F I	技術表示箇所
G 0 9 F 9/00	3 5 0	7426-5H	G 0 9 F 9/00	3 5 0 Z
G 0 2 F 1/1345			G 0 2 F 1/1345	

審査請求 未請求 請求項の数3 O L (全 4 頁)

(21)出願番号 特願平7-177617

(22)出願日 平成7年(1995)7月13日

(71)出願人 000001889

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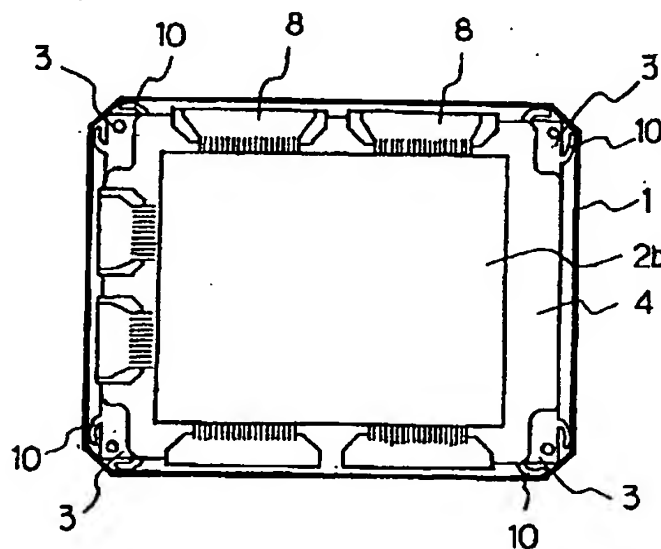
(74)代理人 弁理士 岡田 敬

(54)【発明の名称】 表示モジュール

(57)【要約】

【目的】 シールドケース内にLCDパネルを収納してなるLCDモジュールにおいて、シールドケース内におけるLCDパネルのがたつきを抑え、衝撃や振動に強い機器を得る。

【構成】 LCDパネル(2)を支持するスペーサ(3)の外周に、スペーサ(3)と同一材料で、一端をスペーサ(3)本体と一体で形成された突起物(10)を設けることにより、シールドケース(1)内で、LCDパネル(2)は、突起物(10)の弾力により、弾性的に支持固定され、安定する。



## 【特許請求の範囲】

【請求項1】 表示用のパネル、このパネルを収納するシールドケース、および、前記シールドケース内で、前記パネルを支持するスペーサからなる表示モジュールにおいて、

前記スペーサの外周には弾性を有する第1の突起物が設けられ、前記第1の突起物が前記シールドケースの内壁に当接することにより、前記スペーサは前記シールドケースに所定の間隔を有して弾性的に固定されることを特徴とする表示モジュール。

【請求項2】 表示用のパネル、このパネルを収納するシールドケース、および、前記シールドケース内で、前記パネルを支持するスペーサからなる表示モジュールにおいて、

前記スペーサの内枠には弾性を有する第2の突起物が設けられ、前記パネルと前記スペーサの間隙を支持し、前記パネルは前記スペーサ内で弾性的に固定されることを特徴とする表示モジュール。

【請求項3】 前記突起物は、前記スペーサと同一材料からなり、一端を前記スペーサと一体に形成されていることを特徴とする請求項1または請求項2記載の表示モジュール。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、液晶などを用いた表示パネルと、表示パネルの駆動用LSIを収納した表示モジュールに関する。

## 【0002】

【従来の技術】ディスプレイ装置として、光学部材に液晶を用いた液晶表示装置(LCD: Liquid Crystal Display)は小型、薄型、低消費電力などの利点があり、OA機器、AV機器などの分野で実用化が進んでいる。特に、液晶駆動用の透明電極を交差配置して表示点をマトリクス的に選択しながら電圧を印加するマトリクス型、更には、液晶駆動用の各画素容量にスイッチ素子を接続形成し、線順次で書き換え画素を選択しながら、信号電圧を静電的に常時保持させていくアクティブマトリクス型は、高精細、高コントラスト比の動画表示が可能となり、パーソナルコンピュータのディスプレイ、テレビジョンなどに実用化されている。

【0003】図3に、LCDモジュールの構成図を示す。(1)は板金からなるフロントシールドケース、(2)はLCDパネル、(3)は樹脂製のスペーサ、(4)はプリント配線基板、(5)は板金からなるリアシールドケースである。LCDパネル(2)とプリント配線基板(4)は、シールドケース(1, 5)内において、スペーサ(3)により支持され、収納される。LCDパネル(2)はガラスなどの一对の透明電極基板(2a, 2b)間に液晶を密封したものである。大きい方の電極基板(2a)には、銅箔により配線形成をしたポリ

イミドなどのフレキシブルテープ(6)上に駆動用LSI(7)をボンディング搭載したTCP(tape carrier package)(8)が取り付けられている。プリント配線基板(4)にはインタフェース回路が搭載されており、外部入力信号はプリント配線基板(4)を介して駆動用LSI(7)へ供給される。このようにして画像情報信号電圧が供給されたLCDパネル(2)は、画像に対応した透過率分布が付与され、不図示である別ユニットのバックライト部からの平行光により視認性が与えられる。

【0004】フレキシブルテープ(7)は、一方の端を異方性導電接着剤、即ち、ACF(anisotropic conductive film)により、LCDパネル(2)に露出された端子部に接着され、他の端はプリント配線基板(4)に半田接続され、これら、LCDパネル(2)及びプリント配線基板(4)は、スペーサ(3)により支持されている。

## 【0005】

【発明が解決しようとする課題】LCDパネル(2)とプリント配線基板(4)は、スペーサ(3)に接着され、シールドケース(1, 5)内で固定されるが、通常、シールドケース(1, 5)の内寸とスペーサ(3)の外寸との公差により、シールドケース(1, 5)内でスペーサ(3)ががたつき、特に、車載用、携帯用などの用途では、LCDパネル(2)や駆動用LSI(7)などに振動や衝撃が加わり、装置の安全上、問題があった。

【0006】また、加工上、各部品の寸法にばらつきが多少あることは避けられず、特に、シールドケース(1, 5)の内寸が、スペーサ(3)の外寸よりも僅かでも小さい場合、スペーサ(3)をシールドケース(1, 5)内に収納する際、作業が困難になり、効率が落ちるのみならず、モジュールの完成が不能となり、部品が無駄になる、歩留まりが下がるなどの問題を招いていた。

## 【0007】

【課題を解決するための手段】本発明はこの課題を解決するために成されたもので、第1に、表示用のパネル、このパネルを収納するシールドケース、および、前記シールドケース内で前記パネルを支持するスペーサからなる表示モジュールにおいて、前記スペーサの外周には弾性を有する第1の突起物が設けられ、前記シールドケースの内壁と前記スペーサの間隙を支持し、前記スペーサは前記シールドケース内で弾性的に固定される構成である。

【0008】第2に、表示用のパネル、このパネルを収納するシールドケース、および、前記シールドケース内で前記パネルを支持するスペーサからなる表示モジュールにおいて、前記スペーサの内枠には弾性を有する第2の突起物が設けられ、前記パネルと前記スペーサの間隙

を支持し、前記パネルは前記スペーサ内で弾性的に固定され第3に、第1または第2の構成において特に、前記突起物は、前記スペーサと同一材料からなり、一端を前記スペーサと一体に形成されている構成である。

【0009】

【作用】本発明の第1及び第2の構成で、表示パネルを支持するスペーサに弾性を有した突起物を設け、シールドケース内で弾性的に固定することにより、スペーサに支持された表示パネルもまた弾力をもって固定されるため、振動や衝撃に強い表示機器が得られる。

【0010】本発明の第3の構成で、スペーサをシールドケースに弾性的に固定する突起物を、スペーサの枠体と同一材料で、かつ、一端をスペーサ本体と一体に形成することにより、弾性を有した突起物が工程を追加すること無く得られ、コストの増大はない。

【0011】

【実施例】続いて、本発明の実施例を詳細に説明する。図1は、本発明の第1の実施例にかかるLCDモジュールの上面図である。(1)は板金を加工したフロントシールドケース、(2)は透明な基板上に透明電極を形成した1対の透明電極基板間に液晶を密封し、画素ごとに異なる電圧を印加することにより表示画像情報に対応した透過率分布に制御されたLCDパネル、(3)は樹脂材料からなるスペーサ、(4)は硝子エポキシ樹脂上に所定の回路パターンを形成したプリント配線基板、である。また図示は省いたが通常は、紙面手前側より板金からなるリアシールドケース(5)が装着されて、モジュールが完成される。LCDパネル(2)は、小さい方の電極基板(2b)が紙面手前に向けられ、不図示である紙面向こう側の大きい方の電極基板(2a)側には、銅箔により配線形成を行ったポリイミドなどのフレキシブルテープ上に駆動用LSIをボンディング搭載してなるTCP(tape carrier package)(8)が、異方性導電接着剤、即ち、ACF(anisotropic conductive film)により接着され、LCD電極配線に電氣的に接続されている。TCP(8)の他端は紙面手前に側に回されて、半田によりプリント配線基板(4)に接続されている。プリント配線基板(4)には、インタフェース回路が搭載され、入力信号をLCD駆動用に変換して、各駆動用LSIに分配している。これらLCDパネル

(2)、プリント配線基板(4)は、スペーサ(3)により支持され、シールドケース(1, 5)により外枠が形成されて、LCDモジュールに組み立てられている。

【0012】スペーサ(3)の最外周には、スペーサ(3)と同一の樹脂材料で、かつ、一端をスペーサ(3)本体と一体に形成されて弾性を付与された突起物(10)が設けられている。突起物(10)はスペーサ(3)の四角に設けられ、この突起物(10)を含んだスペーサ(3)の縦横寸法は、シールドケース(1, 5)の内寸よりも大きく、かつ、突起物(10)を除く

スペーサ(3)本体の縦横寸法は、シールドケース(1, 5)の内寸よりも小さい。このため、スペーサ(3)は、シールドケース(1, 5)内に収納容易であるとともに、突起物(10)がシールドケース(1, 5)の内壁に弾性的に押さえ込まれる反作用により、スペーサ(3)は、シールドケース(1, 5)内で弾性的に固定される。

【0013】このような突起物(10)は、スペーサ(3)と一体の樹脂製であり、スペーサ(3)の加工時に同時に形成されるものであり、工程の追加は不要であるため、コストの増加はない。図2は、本発明の第2の実施例にかかるLCDモジュールの裏面図である。第1の実施例と同じ対象物に対しては、同一の符号を付している。紙面手前にはLCDパネル(2)があり、その背後にはスペーサ(3)、更に、その向こう側には不図示であるプリント配線基板(4)がある。LCDパネル(2)は、大きい方の電極基板(2a)を手前に向け、小さい方の電極基板(2b)は、鎖線で示すように紙面の向こう側にある。本実施例では、LCDパネル(2)は、スペーサ(3)には、接着されてはおらず、LCDパネル(2)の四角において、スペーサ(3)側に設けられた突起物(11)により支持されている。即ち、図2においてLCDパネル(2)の背後にはスペーサ(3)があり、2点鎖線で示した開口部がLCDパネル(2)の表示部に位置し、LCDパネル(2)の四角に対応する部分では、スペーサ(3)本体平面から迫り出た支持部(3a)があり、この支持部(3a)にLCDパネル(2)に直接に接する突出部(11)が設けられている。この突起物(11)は、第1の実施例において説明した突起物(10)と同様、スペーサ(3)と同一の樹脂材料よりなり、一端をスペーサ(3)本体と一体に形成されて弾性を有している。LCDパネル(2)は、スペーサ(3)に形成された内枠部に装着されるが、その際、LCDパネル(2)は、その四角においてスペーサ(3)の内枠に設けられた突起物(11)により弾性的に支持される。突起物(11)間で構成される寸法は、LCDパネル(2)の外寸よりも小さく、かつ、突起物(11)を除くスペーサ(3)内枠の寸法は、LCDパネル(2)よりも大きく形成されている。このため、組み立て工程においては、突起物(11)を押さえ込みながらLCDパネル(2)をスペーサ(3)に装着することにより、LCDパネル(2)は、突起物(11)からの反作用により、弾的にスペーサ(3)に固定され、安定する。また、LCDパネル(2)をスペーサ(3)に接着するための、接着剤の塗布が不要となるため、工数が削減され、コスト的にも有利である。なお、図2にも示しているように、第1の実施例で説明したようにスペーサ(3)外周にも突起物(10)を形成し、これら突起物(10, 11)の作用により、LCDパネル(2)とスペーサ(3)間及びシールドケース

(1)とスペーサ(3)間で、弾性を持たせる構成も可能である。

【0014】

【発明の効果】以上の説明から明らかな如く、本発明で、シールドケース内に表示用のパネルを収納してなる表示モジュールにおいて、スペーサに弾性を有した突起物を設け、表示パネルとスペーサ間、あるいは、シールドケースとスペーサ間の間隙を支持させることにより、表示パネルが弾性的に固定されて安定するため、衝撃や振動に強い表示機器が得られる。

【0015】また、このような突起物をスペーサと同一材料で、かつ、一端をスペーサ本体と一体で形成することで、工程の追加が不要で、コスト的にも有利である。

【図面の簡単な説明】

【図1】本発明の第1の実施例にかかるLCDモジュールの上面図である。

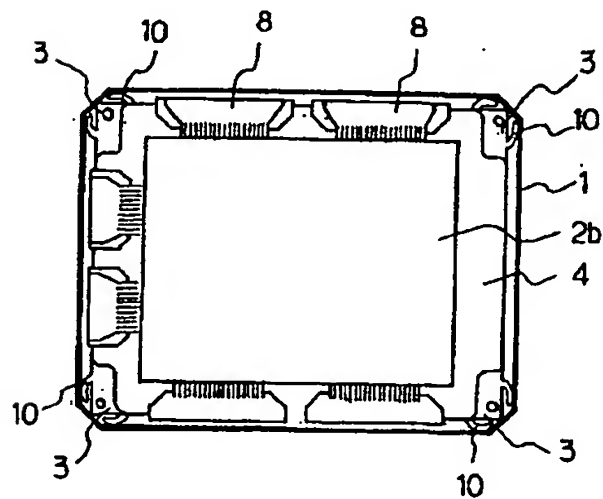
【図2】本発明の第2の実施例にかかるLCDモジュールの裏面図である。

【図3】LCDモジュールの構成図である。

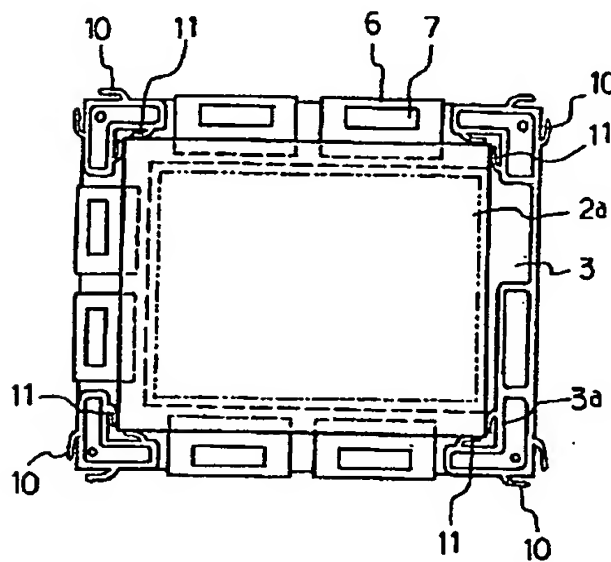
【符号の説明】

- 1 フロントシールドケース
- 2 LCDパネル
- 3 スペーサ
- 4 プリント配線基板
- 5 リアシールドケース
- 6 フレキシブルテープ
- 7 駆動用LSI
- 8 TCP
- 10, 11 突起物

【図1】



【図2】



【図3】

